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Inappropriate electrolyte repletion for patients undergoing endoscopic procedures

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Inappropriate electrolyte repletion for patients undergoing endoscopic procedures

Dan Altman, Solomon Dawson, Kevin Kwak, Drew Johnson, Harshal Mehdi, Christie Mulholland

Thomas Jefferson University Hospital

Introduction

- At Thomas Jefferson University Hospital (TJUH), there has been a perceived necessity among housestaff and fellows to routinely check and replete serum potassium and magnesium for inpatients prior to endoscopic procedures
- In addition, there was an unwritten policy that these electrolytes needed to be aggressively repleted, with a goal potassium above 4.0 and magnesium above 2.0
- Contributing factors include absence of clear policy, fear of adverse outcomes during procedures, and fear of delay of procedures leading to increased hospital stay
- This practice has led to unwarranted lab draws, costs of lab tests and electrolyte riders, and possible delayed procedures

Goals

- Clarify policies regarding electrolyte repletion
- Determine frequency of inappropriate electrolyte checking and repletion
- Determine monetary cost of this action
- Decrease frequency of inappropriate electrolyte lab check and repletion

Methods

Pre-Intervention

- Chart review of patients who were admitted for gastrointestinal bleed between 5/4/2015 and 7/31/2016 to the hospitalist service.
- 93 patients that led to 77 individual trips to the endoscopy suite

Looked at:

- Frequency of checking Magnesium and Potassium Levels
- Appropriateness of repletion of potassium and magnesium, as defined as within normal range
- Costs of inappropriate electrolyte repletion

Intervention - (performed between 12/2016-01/2017)

- Meeting with anesthesiologists, charge RN in endoscopy suite, and gastroenterology fellows to clarify policy
- Emailed housestaff on not checking and repleting electrolytes prior to scheduled endoscopies; if electrolyte levels were checked for other reasons, there was no need to replete unless abnormal (potassium <3.4, magnesium <1.3)
- Spoke with the senior staff of each hospitalist team clarifying policy
- Addition of instructions on the front of handoff documentation
- Signs were posted in housestaff work areas

Post-Intervention

- Chart review of patients admitted with diagnosis of gastrointestinal bleed between 2/1/7 and 2/28/17 to hospitalist service
- 4 patients that led to 5 individual trips to the endoscopy suite
- Collected data regarding same parameters as pre-intervention

Results

Unofficial policy as per anesthesiology department:

- There is no need for monitoring and repletion electrolytes prior to endoscopic procedures unless clinically indicated
- Clinical indications include: history of cardiac arrhythmia, aggressive diuresis during hospitalization

		Pre	Post
Admission for GIB		93	4
Individual Trips to Endoscopy		77	5
Procedure Type	EGD	55	5
	Colo	42	1
K Checked		68	4
Mg Checked		64	3
K Repleted		30	0
Mg Repleted		45	0
K Repleted appropriately		8	0
Mg Repleted appropriately		3	0
Repletion entered by Primary Team		52	0

Innapropriate K Repletion/Total Repletion	73%
Innapropriate Mg Repletion/Total Repletion	93%
K=\$1.39 for 20MeQ Rider Mg=\$5.24 for 2g Rider	
Amount of Innnapropriate K	610mEq
Amount of Innnapropriate Mg	95.6g
Amount Spent on Innnapropriate K (\$)	42.395
Amount Spent on Innnapropriate Mg (\$)	250.472
Total Cost Extra Cost of Medicine (\$)	292.867

Discussion

This project demonstrated the frequency of inappropriate electrolyte repletion and clarify a wide spread idea held by many residents, fellows, and nursing staff. In addition, by notifying housestaff of this policy through various means of communication, we sought to decrease the amount of inappropriate electrolyte repletions.

A literature search revealed no clear benefit to repleting potassium and magnesium prior to endoscopic procedures. A 2014 guideline paper from the American Society for Gastrointestinal Endoscopy recommends against routine testing of serum chemistries prior to endoscopy in healthy patients. The paper suggests that testing may be indicated for only a subset of patients with a history of endocrine, renal or hepatic dysfunction and for those on medications that may further impair function. Although a good portion of our hospitalized patients belong to this subset, housestaff should be encouraged to consider each patient's medical complexity rather than uniformly checking electrolytes.

Additionally, a 2008 guideline paper from the ASGE discusses the risks associated with anesthesia administered during endoscopies. The paper mentions a risk of QT prolongation in hypokalemia and hypomagnesemia with droperidol, which is a second-line adjunct sedative, and which is rarely used in practice. Furthermore, there is no mention of any other risks associated with first-line or any other sedatives.

Our chart review found that almost all patients (68/77) had their potassium checked prior to going to endoscopy, and almost as many (64/77) had their magnesium checked. Unfortunately our chart review did not include clinical data regarding kidney function or cardiac function, so it is hard to say whether this was an appropriate amount of pre-endoscopy testing.

Analysis of our repletion practice showed that the large majority of our repletions (73% and 93% respectively) of Potassium and magnesium are inappropriate. This clearly indicates that there is a problem with our practice at Jefferson.

While it is likely that our interventions decreased the inappropriate repletion of electrolytes (information gleaned from anecdotal review of night float tasks) the very limited patient population open to our chart review post-intervention limited our ability to identify the magnitude of our impact.

Future

- Analyze large post-intervention patient group
- Measure amount of time taken for nursing staff to administer repletion
 - Determine time/productivity lost
- Form multi-disciplinary group to create official policy regarding this topic

Key points

- 1.) No clear policy in place requiring electrolyte measurement or repletion pre-endoscopy
- 2.) Majority of electrolyte repletion pre-endoscopy is inappropriate
- 3.) Relatively small number of patients are admitted to hospitalist service with this problem each month

References

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